

Claim Amendments

1. (Cancelled)
2. (Cancelled)
3. (Cancelled)
4. (Cancelled)
5. (Cancelled)
6. (Currently amended) The apparatus of claim ~~[[5]~~ 45 wherein:
the clamping actuator is attached to one of the vertical columns; and
the reaction system comprises:
 - a lever arm pivotally attached to the upper guide rail adjacent to the one vertical column; and
 - a reaction actuator connected to the lever arm for applying the reaction force to the one vertical column.
7. (Original) The apparatus of claim 6 wherein the reaction actuator is connected to an end of the lever arm such that the other end of the lever arm engages the one vertical column and thereby applies the reaction force thereto.
8. (Original) The apparatus of claim 6 wherein the reaction actuator is attached to an end of the lever arm such that the reaction actuator engages the one vertical column and thereby applies the reaction force thereto.

9. (Original) The apparatus of claim 6 wherein:
the clamping actuator and the reaction actuator are hydraulic cylinders; and
the clamping actuator and the reaction actuator are connected to a single pressure source.
10. (Original) The apparatus of claim 9 further comprising regulators connected to the clamping actuator and the reaction actuator.
11. (Cancelled)
12. (Previously presented) The apparatus of claim 38 further comprising a plurality of links pivotally attached to the clamping force bar and to the upper guide bar.
13. (Currently amended) The apparatus of claim ~~[[44]]~~ 38 further comprising a bushing mounted in the first vertical column wherein a portion of the clamping acutator is supported by the bushing.
14. (Previously presented) The apparatus of claim 38 wherein the reaction system further comprises a reaction actuator to engage one of the vertical columns.
15. (Currently amended) The apparatus of claim ~~[[5]]~~ 45 wherein:
the conveyor has a guide rail extending from opposite sides thereof; and
lower ends of the vertical columns in the shuttle vise are supported by the guide rails and movable therealong.

16. (Original) The apparatus of claim 15 further comprising a plurality of rollers mounted on the lower ends of the vertical columns and engaging the horizontal rails and thereby giving rolling support on the horizontal rails.

17. (Cancelled)

18. (Cancelled)

19. (Cancelled)

20. (Cancelled)

21. (Cancelled)

22. (Cancelled)

23. (Cancelled)

24. (Cancelled)

25. (Cancelled)

26. (Cancelled)

27. (Cancelled)

28. (Cancelled)

29. (Cancelled)

30. (Cancelled)

31. (Cancelled)

32. (Currently amended) The apparatus of claim ~~[[31]]~~ 40 further comprising a spacer disposed between the conveyor and the feed table frame, the spacer supporting the conveyor along substantially the entire length thereof.

33. (Cancelled)

34. (Previously presented) The apparatus of claim 41 further comprising a plurality of rollers mounted on the lower ends of the vertical columns and engaging the horizontal rails and thereby giving rolling support on the horizontal rails.

35. (Cancelled)

36. (Cancelled)

37. (Cancelled)

38. (Previously presented) A feed table apparatus for use in moving a workpiece to a machine tool, the apparatus comprising:

a conveyor for supporting the workpiece;

a shuttle vise movably disposed on the conveyor and having jaws thereon adapted for clamping the workpiece when a clamping force is applied thereto, wherein the shuttle vise comprises:

a first vertical column;

a second vertical column;

an upper guide rail interconnecting upper portions of the first and second vertical columns, wherein at least one of the jaws is movably disposed on the upper guide rail; and

a clamping actuator for moving the one jaw into and out of clamping engagement with the workpiece and applying the clamping force thereto; and

a reaction system connected to the shuttle vise adapted for applying a reaction force in an opposite direction of the clamping force and thereby substantially counteracting the clamping force, wherein the reaction system comprises a clamping force bar disposed adjacent to the upper guide rail, wherein the clamping actuator is attached to the clamping force bar such that clamping forces are not transmitted to the vertical columns of the shuttle vise.

39. (Previously presented) A feed table apparatus for use in moving a workpiece to a machine tool, the apparatus comprising:

a conveyor for supporting the workpiece;

a shuttle vise movably disposed on the conveyor, the shuttle vise comprising:

a first vertical column;

a second vertical column;

an upper guide rail interconnecting upper portions of the first and second vertical columns;

a first jaw movably disposed on the upper guide rail; and

a second jaw opposite the first jaw; and

a reaction system connected to the shuttle vise and adapted for applying a reaction force in an opposite direction of the clamping force and thereby substantially counteracting the clamping force, the reaction system comprising a clamping force bar disposed adjacent to the

upper guide rail, wherein the reaction system further comprises a plurality of links pivotally attached to the clamping force bar and to the upper guide rail; and

a clamping actuator for moving the first jaw toward the second jaw and thereby providing clamping engagement of the first and second jaws with the workpiece and applying a clamping force thereto, the clamping actuator being attached to the clamp force bar such that the clamping forces are not transmitted to the vertical columns of the shuttle vise.

40. (Previously presented) A feed table apparatus for use in moving a workpiece to a machine tool, the apparatus comprising:

a conveyor for supporting the workpiece;

a shuttle vise movably disposed on the conveyor, the shuttle vise comprising:

a first vertical column;

a second vertical column;

an upper guide rail interconnecting upper portions of the first and second vertical columns;

a first jaw movably disposed on the upper guide rail; and

a second jaw opposite the first jaw; and

a reaction system connected to the shuttle vise and adapted for applying a reaction force in an opposite direction of the clamping force and thereby substantially counteracting the clamping force, the reaction system comprising a clamping force bar disposed adjacent to the upper guide rail;

a clamping actuator for moving the first jaw toward the second jaw and thereby providing clamping engagement of the first and second jaws with the workpiece and applying a

clamping force thereto, the clamping actuator being attached to the clamp force bar such that the clamping forces are not transmitted to the vertical columns of the shuttle vise; and

a feed table frame, wherein the conveyor is attached to the feed table frame and supported along a length of the conveyor.

41. (Previously presented) A feed table apparatus for use in moving a workpiece to a machine tool, the apparatus comprising:

a conveyor for supporting the workpiece and having a guide rail extending from opposite sides thereof;

a shuttle vise movably disposed on the conveyor, the shuttle vise comprising:

a first vertical column;

a second vertical column, wherein lower ends of the first and second vertical columns are supported by the guide rails extending from the conveyor and moveable therealong;

an upper guide rail interconnecting upper portions of the first and second vertical columns;

a first jaw movably disposed on the upper guide rail; and

a second jaw opposite the first jaw; and

a reaction system connected to the shuttle vise and adapted for applying a reaction force in an opposite direction of the clamping force and thereby substantially counteracting the clamping force, the reaction system comprising a clamping force bar disposed adjacent to the upper guide rail; and

a clamping actuator for moving the first jaw toward the second jaw and thereby providing clamping engagement of the first and second jaws with the workpiece and applying a

clamping force thereto, the clamping actuator being attached to the clamp force bar such that the clamping forces are not transmitted to the vertical columns of the shuttle vise.

42. (Previously presented) A feed table apparatus for use in moving a workpiece to a machine tool, the apparatus comprising:

- a conveyor for supporting the workpiece;

- a shuttle vise movably disposed on the conveyor, the shuttle vise comprising:

 - a first vertical column;

 - a second vertical column, wherein lower ends of the first and second vertical columns are not interconnected;

 - an upper guide rail interconnecting upper portions of the first and second vertical columns;

 - a first jaw movably disposed on the upper guide rail; and

 - a second jaw opposite the first jaw; and

- a reaction system connected to the shuttle vise and adapted for applying a reaction force in an opposite direction of the clamping force and thereby substantially counteracting the clamping force, the reaction system comprising a clamping force bar disposed adjacent to the upper guide rail; and

- a clamping actuator for moving the first jaw toward the second jaw and thereby providing clamping engagement of the first and second jaws with the workpiece and applying a clamping force thereto, the clamping actuator being attached to the clamp force bar such that the clamping forces are not transmitted to the vertical columns of the shuttle vise.

43. (Previously presented) A feed table apparatus for use in moving a workpiece to a machine tool, the apparatus comprising:

a conveyor for supporting the workpiece;

a shuttle vise movably disposed on the conveyor, the shuttle vise comprising:

a first vertical column;

a second vertical column;

an upper guide rail interconnecting upper portions of the first and second vertical columns;

a first jaw movably disposed on the upper guide rail; and

a second jaw opposite the first jaw; and

a reaction system connected to the shuttle vise and adapted for applying a reaction force in an opposite direction of the clamping force and thereby substantially counteracting the clamping force, the reaction system comprising a clamping force bar disposed adjacent to the upper guide rail and a reaction actuator for engaging one of the vertical columns; and

a clamping actuator for moving the first jaw toward the second jaw and thereby providing clamping engagement of the first and second jaws with the workpiece and applying a clamping force thereto, the clamping actuator being attached to the clamp force bar such that the clamping forces are not transmitted to the vertical columns of the shuttle vise.

44. (Previously presented) A feed table apparatus for use in moving a workpiece to a machine tool, the apparatus comprising:

a conveyor for supporting the workpiece;

a shuttle vise movably disposed on the conveyor, the shuttle vise comprising:

a first vertical column;

a second vertical column;

an upper guide rail interconnecting upper portions of the first and second vertical columns;

a first jaw movably disposed on the upper guide rail; and

a second jaw opposite the first jaw, the second jaw being stationary; and

a reaction system connected to the shuttle vise and adapted for applying a reaction force in an opposite direction of the clamping force and thereby substantially counteracting the clamping force, the reaction system comprising a clamping force bar disposed adjacent to the upper guide rail; and

a clamping actuator for moving the first jaw toward the second jaw and thereby providing clamping engagement of the first and second jaws with the workpiece and applying a clamping force thereto, the clamping actuator being attached to the clamp force bar such that the clamping forces are not transmitted to the vertical columns of the shuttle vise.

45. (New) A feed table apparatus for use in moving a workpiece to a machine tool, the apparatus comprising:

a conveyor for supporting the workpiece;

a shuttle vise movably disposed on the conveyor and having jaws thereon adapted for clamping the workpiece when a clamping force is applied thereto, the shuttle vise comprising:

a first vertical column;

a second vertical column; and

an upper guide rail interconnecting upper portions of the first and second vertical columns, wherein at least one of the jaws is movably disposed on the upper guide rail;

a clamping actuator for moving the one jaw into and out of clamping engagement with the workpiece and applying the clamping force thereto; and

a reaction system connected to the shuttle vise adapted for applying a reaction force in an opposite direction of the clamping force and thereby substantially counteracting the clamping force such that the clamping force is not applied to the conveyor.